



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

|  |             |                      |                     |                  |
|--|-------------|----------------------|---------------------|------------------|
| APPLICATION NO.                                  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 10/809,437                                       | 03/26/2004  | Hongyu Yue           | 250638US6 Y/A       | 8105             |
| 22850  | 7590        | 12/08/2008           | EXAMINER            |                  |
| OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. |             |                      | ANYA, IGWE U        |                  |
| 1940 DUKE STREET                                 |             |                      | ART UNIT            | PAPER NUMBER     |
| ALEXANDRIA, VA 22314                             |             |                      | 2891                |                  |
| NOTIFICATION DATE                                |             | DELIVERY MODE        |                     |                  |
| 12/08/2008                                       |             | ELECTRONIC           |                     |                  |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

|                              |                                      |                                   |
|------------------------------|--------------------------------------|-----------------------------------|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/809,437 | <b>Applicant(s)</b><br>YUE ET AL. |
|                              | <b>Examiner</b><br>IGWE U. ANYA      | <b>Art Unit</b><br>2891           |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 07 August 2008.

2a) This action is FINAL.      2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-18 is/are pending in the application.

4a) Of the above claim(s) 13-18 is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1-12 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 26 March 2004 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All    b) Some \* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-1668)  
Paper No(s)/Mail Date 12/3/04; 1/7/08

4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_

5) Notice of Informal Patent Application

6) Other: \_\_\_\_\_

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election of Group 1 (claims 1 – 12) in the reply filed on August 7, 2008 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1 – 4 and 6 – 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Angell et al. (US 5,658,423).

4. Angell et al. teach a method of monitoring a processing system for processing a substrate during the course of semiconductor manufacturing (fig. 1), comprising:  
acquiring data from said processing system for a plurality of observations, said data comprising a plurality of data variables (fig. 2A element 10);

determining one or more principal components of said data for said plurality of observations using principal components analysis (fig. 2A element 20);

weighting at least one of said plurality of data variables during said principal components analysis (fig. 2A elements 30, 50);

acquiring additional data from said processing system (fig. 2B element 60);

determining at least one statistical quantity from one or more scores calculated from a projection of said additional data onto said one or more principal components (fig. 2B element 80);

determining a control limit for said at least one statistical quantity (fig. 2A element 40); and

comparing said at least one statistical quantity to said control limit (fig. 2B element 100).

wherein a process fault has occurred when said at least one statistical quantity exceeds said control limit (col. 7 lines 40 – 49);

wherein said data comprises at least one of a capacitor position, a forward radio frequency (RF) power, a reflected RF power, a voltage, a current, a phase, an impedance, a RF peak- to-peak voltage, a RF self-induced direct current bias, a chamber pressure, a gas flow rate, a temperature, a backside gas pressure, a backside gas flow rate, an electrostatic clamp voltage, an electrostatic clamp current, a focus ring thickness, RF hours, a process step duration, focus ring RF hours, an optical emission spectrum, and RF harmonics (col. 4 lines 4 – 67);

wherein said data comprises at least one of an instantaneous value, a time average, a standard deviation, a third moment, a fourth moment, and a variance (col. 7 lines 50 – 56);

wherein said determining at least one statistical quantity further comprises a back-projection of said one or more scores with said one or more principal components to determine one or more residual errors (fig. 2B);

wherein said back-projection of said one or more scores with said one or more principal components comprises matrix multiplication (col. 7 lines 7 – 40);

wherein said projection of said additional data onto said one or more principal components comprises matrix multiplication;

wherein said weighting at least one of said plurality of data variables comprises applying a weighting factor (fig. 4, col. 3 lines 51 – 67);

wherein said weighting factor is determined from at least one of a data standard deviation (S<sub>0</sub>), a desired standard deviation of said data variable (S<sub>d</sub>), a relative importance of said variable (f), and a data resolution (R) (col. 5 line 50 – col. 6 line 20);

wherein said weighting at least one of said plurality of data variables comprises applying a group scaling method (col. 6 line 50 – col. 6 line 20); and

further comprising, accessing at least one of said data, said additional data, said at least one statistical quantity, and said control limit via at least one of an intranet, and an internet (fig. 1).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Angell et al. in view of Le et al. (US 6,153,115).

9. Angell et al. teach the features previously outlined, but lack wherein said statistical quantity comprises at least one of a distance to model parameter (DModX), and a Hotelling T2 parameter.

10. However, Le et al. teach a method of determining at least one statistical quantity comprising at least one of a distance to model parameter (DModX), and a Hotelling T2 parameter from one or more scores calculated from a projection of new data onto one or more principal components of old data (figs. 5 – 10) for the benefit of increasing the Hotelling/Standard Deviation ratio, thereby increasing accuracy.

11. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Le et al. into the Angell et al. reference for the benefit of increasing accuracy in determining a change.

***Conclusion***

12. Prior art made of record and not relied upon, considered pertinent to applicant's disclosure are listed in PTO-892 Form.

***Contact Information***

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to IGWE U. ANYA whose telephone number is (571)272-1887. The examiner can normally be reached on M - F 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue A. Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Marcos D. Pizarro/  
Primary Examiner, Art Unit 2814

/Igwe U. Anya/  
Examiner, Art Unit 2891

November 26, 2008